But, if you stood on an elevator what would the scale read if

If you stand on a scale, it usually gives your weight, the force of gravity pulling you down.

But if someone pushes you down, the scale doesn't read your weight, in general the scale gives the Normal or restoring force.

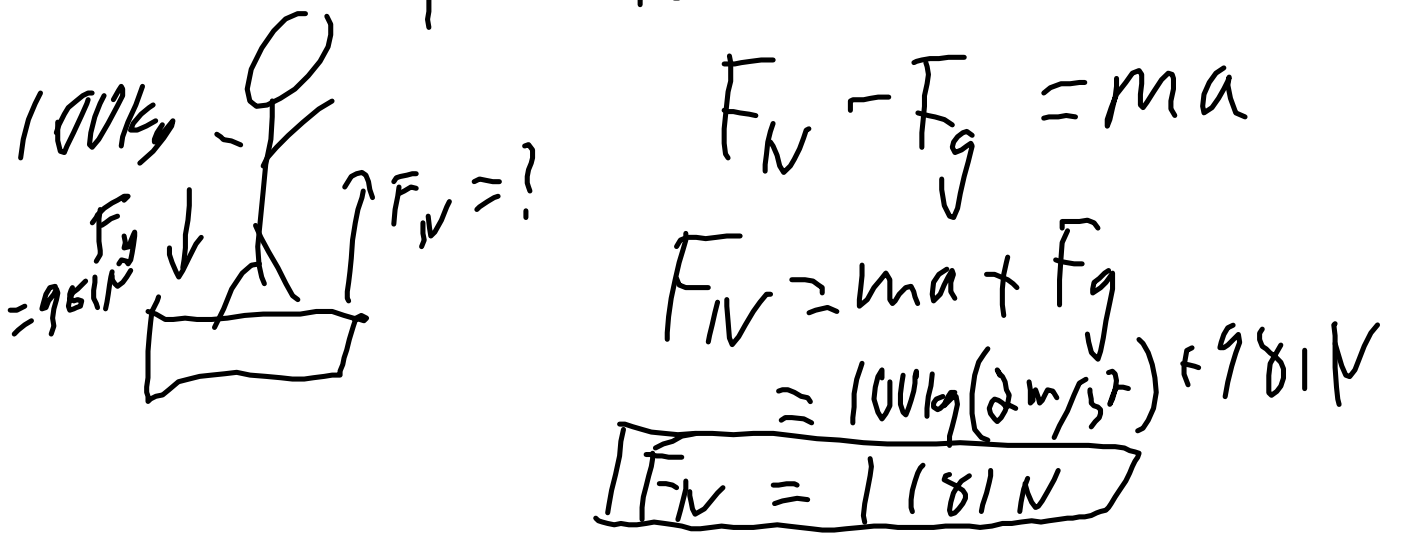
1. you are 100.0 kg, the scale reads in Newtons and

a) you are at rest

F=ma

F_g=mg = 100.0kg x 9.81N/kg = 981N

b) you accelerate up at 2.0 m/s^2 for 3.0 s



c) you move at a constant 6.0 m/s velocity up for 4.0s

a=0 so F_N=F_g=981N

d) the elevator slows to a stop over 2.0s.

$a = (v-u)/t = (0-6.0\ m/s)/2.0s = -3.0\ m/s^2$
$F_N = ma + mg = 100kg(-3.0m/s^2) + 981N$
$F_N = 681N$

e) the elevator accelerates down at 2.0 m/s^2 for 1.0s

$F_N = ma + mg = 100kg(-2.0m/s^2) + 981N$
$= 781N$

f) then the cable breaks and the elevator free falls 20.0 m.

$F_N=0$ freefall - (F_g is still 981N but you feel weightless)

g) When the car hits the ground, you stop over 1.5m of bending your knees.

$v^2 = u^2 + 2as = (2.0m/s)^2 + 2\ (9.81m/s^2)\ (20.0m)$
$v^2 = 4+(40x9.81)=396.4$ Sqrt(396.4)= 19.90979658359171

$v^2 = u^2 + 2as$

0=396.4 +2a(1.5)
a = 396.4/3=132.1333
F_N= ma + mg = (100x132)+981=14,181
1.42 x 10^4N (that's like lifting 1.4 Tonne object)

g) sketch a F_N t graph
Think about what is the net force at each point

1. a 200 g and 250 g mass connected over a pulley. Determine the acceleration and tension in the strings when you let them go.

a) hang freely
b) the 200 g mass is on a frictionless table
c) the 200g mass is on a table with coefficient of friction of 0.20.

trick - tension cancels out when you look at the whole system
All the questions in Chapter 5
p92-103 problems 1-16, CR 1.1-1.4, 2.1.-2.4
Quiz Forces Nov 17th